



PACIFIC DISCOVERY

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THE CHIPS ARE DOWN FOR DINOSAUR. The deck is marked, the dice are loaded. A tidy bloc of Mountain and Great Basin senators swung their bills through for the Colorado Storage Project with Echo Park Dam included. This was a cynical piece of business, smoothed by customs of senatorial deference which is another term for

PRE-DISCOVERY

the mechanism of vote-swapping. But as Dave Brower, Executive Director of the Sierra Club, points out in the *Club Bulletin* for May, the Senate defeat "came partly because conservationists who don't want to see Echo Park dam built, got tired. 'Write a letter? I wrote one or two last year' seems to summarize an attitude prevalent in many places. Last year's letters did a good job last year, and were filed out of sight last year." BUT THERE IS STILL A CHANCE IN THE HOUSE. "Given conservationist support," Dave says, "there are enough Congressmen against Echo Park dam — this is the feeling — to kill it if the conservationists make themselves heard in time. And a strong conservation showing can keep Echo Park dam dead in the Senate-House Conference." If you haven't written your Congressman this year, DO IT NOW.

If you possibly can, visit Dinosaur National Monument this year — not just with the idea it may be your last chance to see this beautiful place before it is blasted into a mud-hole, but because seeing it as it is and must remain to be worth something to all of us, would be the best way to strengthen your resolve to save it. Those who go, return dedicated. But you need not see Dinosaur to know that "a growing America needs its national parks, all of them, more of them." The loss of Dinosaur, or any single park, would portend darkly for the future. In Committee hearings Dave Brower has seen the evil at work: "And as Dinosaur goes, so goes the national park system. It is this generation's obligation to see that it goes up, not down."

Write that letter now — and buy a copy of *This is Dinosaur* (see Reviews). Graphic art and the written word could hardly have done more to capture the incredible beauty of the place, or to inform us what it is we, the American people, possess in one of the finest yet least known of our national parks and monuments. You will want to own this book. And you will find it invaluable to help convince a friend who is indifferent through pardonable ignorance. This book was written, and its photographs contributed, by people who were passionately convinced of the necessity to save Dinosaur, and knew that others had only to see it, even if through the medium of a book, to be convinced also. None of the contributors to *This is Dinosaur* gets one cent; the proceeds of sales go to the "campaign chest." The publisher, Alfred A. Knopf, reminds us in his part that the organic law creating the National Park Service provided for the preservation of the parks "unimpaired for the enjoyment of future generations."

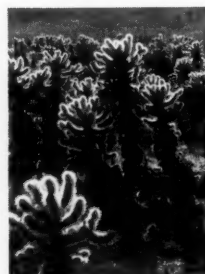
AS WE go to press, the silversword hunter, Sherwin J. Carlquist, with some of his colleagues in the University of California Botany Department and others from Scripps Institution of Oceanography, is en route to another botanical adventure. Destination: Revilla Gigedo Islands off the west coast of Mexico. . . . ¶ Edmund

C. Jaeger, Riverside's desert naturalist, wrote the Joshua article as a sort of chaser after completing the draft of a new book. To be published by Houghton Mifflin, probably in 1956, and tentatively titled *Guide to the Desert*, it was written in collaboration with Lloyd M. Smith. . . . ¶ Since her "Road to a Rusting Dream" last year, Fran Hubbard, whose husband is a Park Service man in Yosemite, has brought to light some new facts about the Tioga Mine operation. . . . ¶ Al Allanson is one of a group of sea-going biologists who base their salty activities on Scripps Institution of Oceanography at La Jolla, California. Rumor reaches us that he has also had a hand in some mysterious archeological diggings along the coast down there. We should look into this. . . . ¶ It is safe to say that nearly every school child in northern California is acquainted with the Academy's Morrison Planetarium lecturers, among whom the least *saturday*, shall we say, is jovial George Bunton. D.G.K.

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THE COVER

DO NOT PET the teddy bears! Sunlight deceptively softens the brutal spines of the cholla or "teddy bear" cactus — Joshua Tree National Monument. Photo by Don Ollis.

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And now, though feeble and short-lived,
Mankind has flaming fire and therefrom
Learns many crafts. HESIOD*

IT SEEMS ODD THAT PROMETHEUS, the Greek god who stole fire from the king of the gods, the culture-bearer and savior of mankind, should turn out to have been a half-brained man in China, who used it only for warmth and knew nothing of cooking," Carleton S. Coon reflects, after telling us in *The Story of Man*† that the hearths which Sinanthropus left in Choukoutien caves are "the first sure evidence of man's use of fire."



From Prometheus J. Sinanthropus to the light hydrogen proton, we've traveled a long, hard way between crossroads. We may patronize the hypothetical first fire user as somewhat short above the eyebrows and shorter still in accumulated culture. Then, striking a superior culturo-intellectual attitude, we may claim to stand today at the first big turning point in human history which finds man fully competent to look both ways and leap in the right direction. The question is — will we? The answer, in plain language: "Brother, we better had!"

For taking a look back of history, reading the story of man in a new light, measuring the growth and weighing the fruit of our tree of culture, and peering a little way ahead, we fortunately have the help of a new kind of historian. He is one who studied man first, and reached the conviction that man may be seen whole only in terms of his cultural progression from limb to — let us hope not limbo. His slant on us in toto puts him well up among those most competent to look ahead and spot the likeliest landing places for our next leap. We note, a bit smugly, that he strengthens some notions of ours, especially the one that we had better stop and bring ourselves morally and ethically up to date with our mechanical development —

* Quoted from Edith Hamilton, *Mythology*.

† The editor's debt to this and the other books on which this essay is based is gratefully acknowledged. See under Reviews for further details and comment.

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Cuts: (above) from *The Tree of Culture*;
(right) from *The Story of Man*; courtesy of
Alfred A. Knopf, Inc., New York

the car is rapidly getting too far ahead of the driver.

Our new guide to history is an anthropologist. His name, for present purposes, is William Howells, Ralph Linton, and Carleton S. Coon.

"Here we are," Dr. Howells begins his book *Back of History*, "frightened in a complicated world of machinery and war, each of us depending on all the rest of us. Somehow we came to be human. And somehow we came to be civilized. But how? . . . History tells us little enough," he says, "but we may look about or dig for other kinds of information about our whole complicated, untidy existence of today, and perceive something of the outlines of its beginnings, its development and its relations to our own animal nature. For the story of man is a nature story." He digs into the fossil record for what we know of the steps by which a still undiscovered protohuman achieved "the brain and hand of man"; he shows how as a Primate this man had to be a social animal; then he comes to the crux of our situation: "Culture is what it takes to be human" (italics ours). And from being "an ever fatter cushion between man and his environment" culture has grown to be his environment. "Man invented culture, and culture promptly took charge of man."

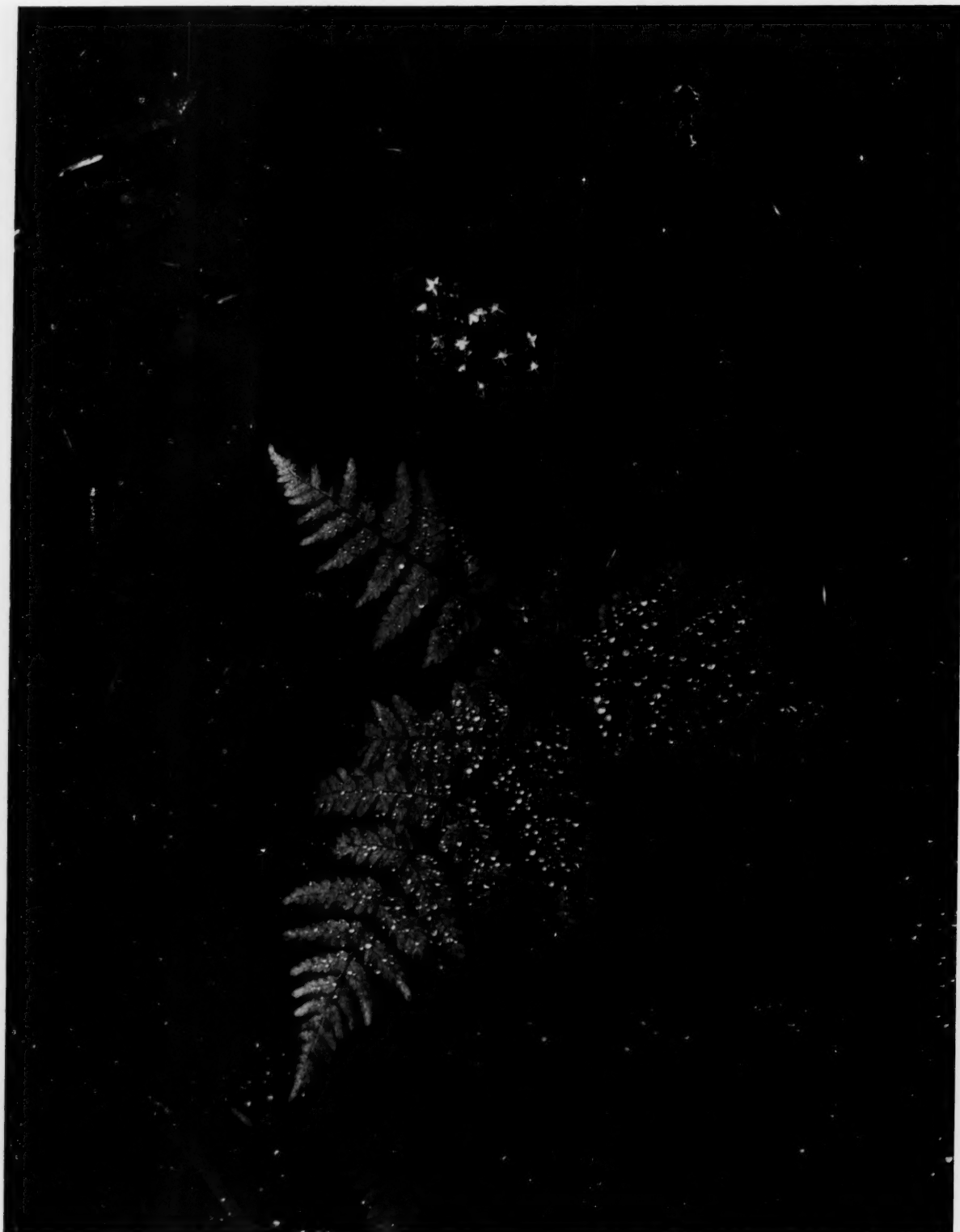
After tracing, through the bulk of his book, the several Neolithic cultures of Old and New worlds down into the light of history, Dr. Howells has a closing look at the cultural fix we presently find ourselves in. "It may turn out that 'Atomic Age' is a pretty good name for it; . . . anyhow we have already given ourselves up mentally" to a future of total machine operation and hence determination of our culture. Some form of world government looms as inescapable corollary — "do not ask when, or what kind. . . . I can only assure you that our social problems are going to be harder than our mechanical problems." But in any case, this anthropologist would rather have us prepare for whatever future by giving constructive thought also to the present. Looking back, he has found us encouragingly robust and adaptable, both physically and mentally. He would have us keep aware of our animal as well as our cultural heritage — our strength lies in both; and lest we fear the animal in us may lose us the race with culture and make it a race into chaos, "we have two bulwarks that seem pretty sound. One is the tremendous power of man to learn and to use his culture;

(Concluded on page 32)



"Always there must be water brought to the dry land, rich earth for ploughing, pasture

for



2

"Water, for a billion years, has shaped the earth — pouring down slopes, sculpturing channels — filling the depths with seas, lakes, and sediments that have themselves formed land. Without water, the earth would be sharp and naked as the moon. . . In water, life began, and water has shaped its long slow evolution until life itself is part of the water cycle. . . Water, rising under the sun as vapor, forming clouds, drifting as mist, cooled by night into dew or frost, . . . drips into forests and grasses. . ." (Nancy Newhall)

for flocks and herds, fish in the seas and streams, and timber in the hills. . .

From depletion came the concept that Nature was wiser and nobler than man . . .

We are responsible now and to the future for what we do to the earth and to all life upon it. . .

Conservation (is) 'the greatest good for the greatest number for the longest time.' . ."


"This is the American Earth"

THE SIERRA CLUB and the California Academy of Sciences announce the opening of the exhibit "This is the American Earth" in the Academy's Hall of Science in San Francisco, on Friday, May 6, 1955.

This exhibit, prepared by Ansel Adams, Nancy Newhall, and Cecil Tose, portrays Conservation in its major aspects, emphasizing the national parks and wilderness areas. It consists of fourteen large panels displaying a stunning series of photographs—ranging from early historic scenes in the drama of American expansion to the finest of contemporary work—linked by a forceful yet poetic text into the theme of Man and Land from ancient days to our own troubled times.

Presenting a lucid interpretation of a subject so vital to our nation and its future, and to all men, the exhibit will serve to strengthen public opinion on the importance of protection and preservation

of the national parks and the remaining wilderness. It is specially pertinent now in view of the immediate threat to one of our most valuable parklands—Dinosaur National Monument—as it clearly shows the irredeemable tragedy, the needless and permanent loss incurred through blind violation of the natural order. The exhibit graphically shows how man's own highest goals can be achieved through understanding that order and living in tune with it. It shows how our life is enriched and ennobled by nature.

After leaving the Academy June 5, the exhibit will be displayed through the summer in Yosemite National Park before going on to other points. Every one who can is urged to see it, for its beauty and for its message. 

Photographs: Lake McDonald, Glacier National Park; Forest Detail, Mount Rainier National Park. (Ansel Adams)



MAUI, KAUAI, AND *five Silverswords*

SHERWIN J.
CARLQUIST

IF ONE can see beyond the pictorial clichés of Diamond Head and Waikiki, there is a Hawaii that has challenged and intrigued scientists for decades, yet is still full of “unexplcres.” They are not the kind of UNEXPLORED that once filled the vacuums in maps, but rather the ones that make gaps in our knowledge of the innumerable kinds of living things.

Above the sultry lowlands of the Islands, mountains rise to over 13,000 feet, snowy in winter, with dense rain forests, bogs, desert plateaus, and frighteningly sharp cliffs. In these various niches of wet and dry, hot and cold, the plants that the chances of dispersal have brought to them have evolved into a diverse, strange, and in many ways unique flora.

With five weeks free to travel and a choice of where to go, I unhesitatingly picked Hawaii. I had been studying some California members of the sunflower family (Compositae). As one might expect, the Hawaiian composites differ from the usual run of the family. There are the silverswords — for my busman’s holiday I would go after these Hawaiian sunflowers which have puzzled and intrigued botanists for generations.

Although the best known silversword is the species (*Argyroxiphium sandwicense*) that grows

high in the volcanic craters of Haleakala on Maui and Mauna Loa on the big island of Hawaii, there is another silversword on Maui’s lesser summit, the mountain the Hawaiians named Puu Kukui. Closely related to the silverswords are the so-called greenswords, and the bizarre iliau, a plant known only from Kauai. With hopes of capturing all five of these botanical rarities, I planned a “silversword itinerary,” and so one morning in August, the month of their blooming, I stepped off a plane in Honolulu.

A chance to learn some of the difficulties of botanizing in Hawaii was offered by Dr. Harold St. John, professor of botany at the University of Hawaii, who took me on a field trip into the Koolau Mountains behind Honolulu. We took a trail leading up the crest of a ridge — it is impossible to climb the steep valley sides or follow the rocky river-filled gulches in the Islands — and soon I was surrounded with a forest of complete botanical strangers.

“This is the ohia lehua, *Metrosideros polymorpha*,” the professor said, giving both native and botanical names of a tree with bright red eucalyptus-like flowers. “The Hawaiians have a superstition that if you pick a flower when you go into the mountains, it will rain.”



Waimea Canyon, Kauai, looks strikingly like a part of the Grand Canyon of the Colorado, Arizona, except that there is more vegetation to contrast with the red-orange of its walls. Like the Grand Canyon, it is being carved by running water but the layers of rock here are lava flows, not sedimentary deposits.

(Photographs from Kodachromes by the author)

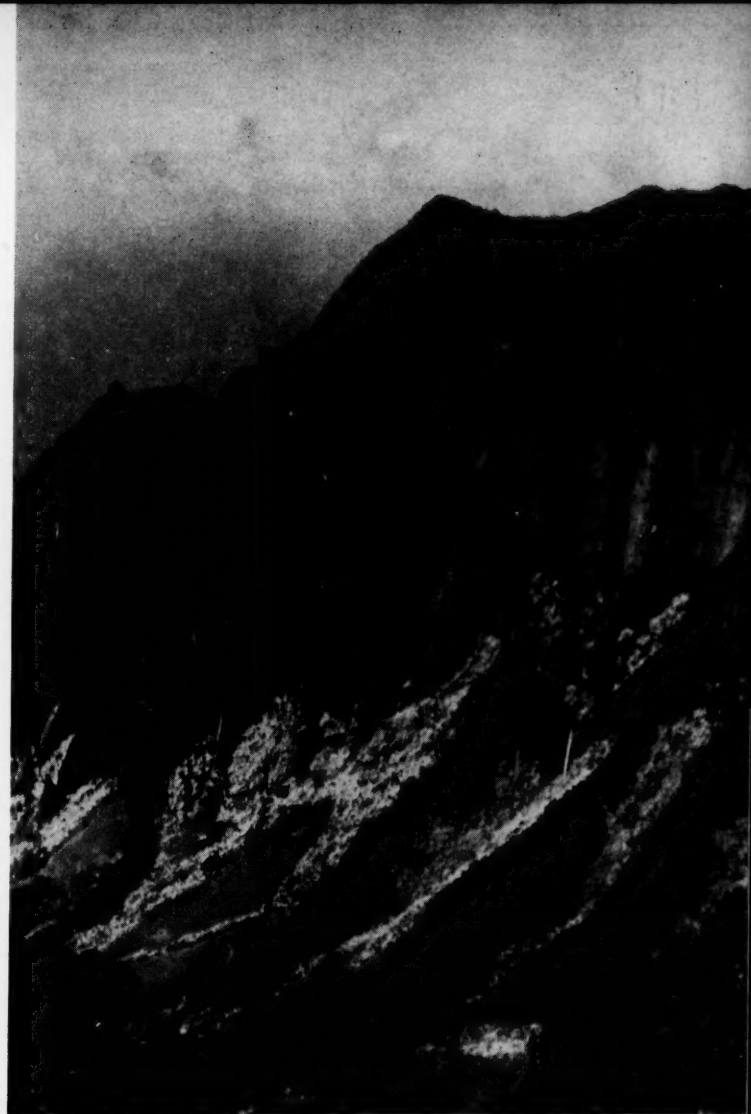
Kalalau Pali, Kauai, drops away four thousand feet to the Pacific. The flutes, or "vertical valleys," in this characteristic Hawaiian type of landscape, are formed mainly by headward erosion.

One by one Dr. St. John introduced me to the members of this fabulously rich vegetation, giving botanical names, Hawaiian names, and native uses. The last two items I soon waived — when introduced to strangers it is hard enough to remember their right first and last names, let alone a set of aliases and "occupations." The early Hawaiians, necessarily sensitive to what their environment had to offer, knew almost all of the island plants by equivalents to the generic and in some cases the specific names of modern botanists. Many of these plants had their place in the local Polynesian culture, even if only in ceremony and legend.

That afternoon as we returned down the ridge it rained, a warm rain and not at all unpleasant. Rain is part of a field trip in Hawaii. The superstition, I decided, was well founded: it rains almost every afternoon in the mountains, with or without an ohia flower.

Kauai was my first objective, the island of the iliau. First, like a tourist, I met Kauai's surprising scenery. The Waimea Canyon is a miniature Grand Canyon in which shelves of vegetation set off the rich oranges of its precipitous sides. Following the Waimea upwards, one comes to a plateau that suddenly ends close to the ocean at the Kalalau Pali, a 4,000-foot drop.

Between the two scenic amazements, canyon and cliff, in occasional pockets of dry forest, may



The ohia lehua's feathery blossoms are flaming red, the eucalyptus-like buds are light blue, red-tipped. Leaves are glossy, magnolia-green.

be found the scraggly stems of the iliau. *Argyroxiphium gymnoxiphium* is something of a misfit among silverswords but can't be related to anything else. Trying to describe this unlikely plant, a botanist might be forced to compare it to a horsetail (*Equisetum*), for the leaves on its pole-like stems are arranged in circles, leaf-bases united — a style suggesting the Paleozoic more than the present. It might also be likened to a century plant or agave, for after perpetrating its odd growth for a number of years the iliau produces an inflorescence in which the flowers are arranged in circular groups separated by green umbrella-like bracts — then the whole plant dies.

While hunting and collecting specimens of this botanic improbability, I regretted there was no time for other items in this odd forest, in which



▲ Haleakala began life as a typical shield volcano, building up by a rapid succession of thousands of thin lava flows. In later stages the erosive force of streams on its slopes was wearing it away faster than its lavas could build. Two of these streams cut deeply from opposite sides of the mountain until the heads of their valleys met at the summit. Thus Haleakala's "crater" was formed by erosion, not eruption. The cinder cones arose in this depression through later volcanic activity. The volcano's most recent lava flows came from near the base of the mountain about 1750 A.D.

➤ The jungle growth in Koolau Gap on the crater's edge includes tree ferns and the dark-leaved ohia lehua tree.

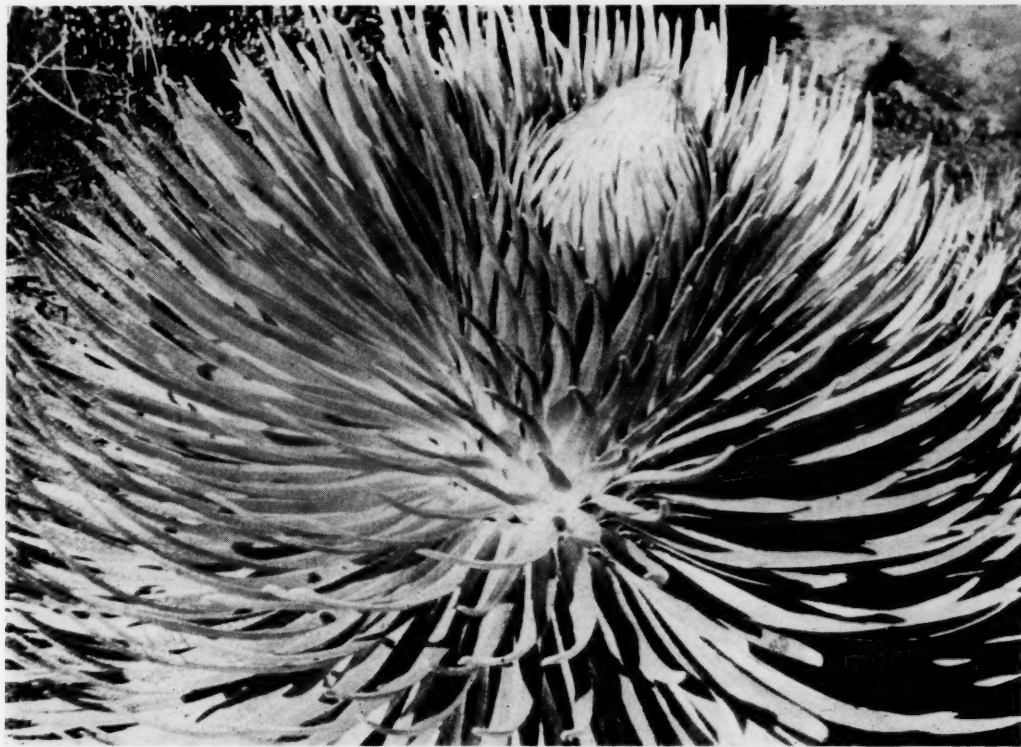
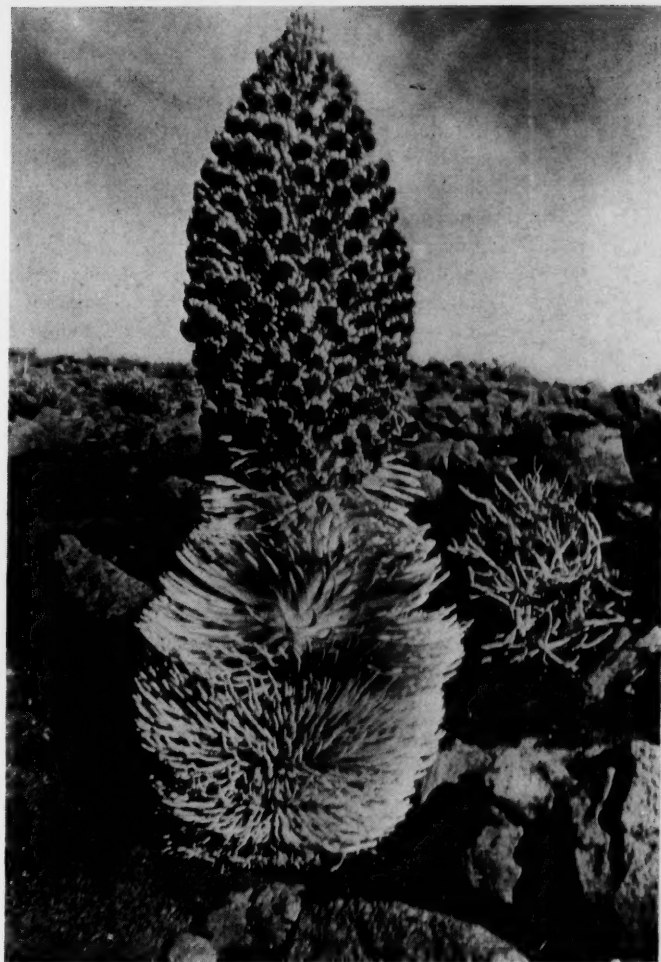


lobelias turn into trees resembling palms. But I had to go on to Maui and the other four silverswords.

Maui is an island of two mountains with a lowland between. Standing in the center and looking east, you will see the volcanic dome of Haleakala above an encircling band of clouds; looking west, you will probably not see Puu Kukui (Puu means peak, Kukui is a native tree) because its top is almost perpetually cloud-covered. On these two summits the silverswords live, a true silversword and a greensword on each.

Taking the road up the leeward side of Haleakala (the dry side — the windward side is covered with an impenetrable thicket of tree-ferns and other vegetable hindrances) you wind by continuous zigzags to the 10,025-foot summit. There lies the expanse of the world's largest extinct volcanic crater, a seven-mile-long vermilion and gray museum of many types of volcanic activity from ancient cinder falls to just barely prehistoric lava flows not yet colonized by plants. The crater's rim, windy and snow covered in winter, effectively cuts off moisture from the floor 3,000 feet below. If you are willing to risk sunburn, a hike across the crater floor is a unique experience: scattered on the vividness of a few cinder cones is an incomparable rarity, the Haleakala silversword.

For most of the year, this plant consists of a rosette of fiercely shining leaves, the appearance caused by its dense felty covering of minute crys-



The Haleakala silversword, *Argyroxiphium sandwicense*, sends its thick flower spike up from a massive cluster of silver scimitars, the giant mass of "sunflowers" reaching a height of six to nine feet.

talline hairs. The Hawaiians doubtless found their vocabulary taxed to describe this one; not having seen silver before white men came, they called it *ahinahina*, doubling their word for gray. Each August a few of these plants end their life by sending up an immense spindle, six to nine feet high, of hundreds of resin-coated flower heads, each head consisting of perhaps a hundred tiny, deep maroon flowers. Considering that the most similar plants botanists relate it to are the diminutive yellow and white tarweeds of California, this silversword is remarkable both to the eye and the mind. Evolution has taken it a long way apart.

More difficult to find is the greensword of Haleakala, for it occurs very sparsely on dry areas on the outside of the crater. To find this plant I crossed the length of the crater and over the east rim. From the top I looked back across the wide crater and ahead to a vast stretch of the Pacific, from which rose the 13,000-foot magnificence of Mauna Kea and Mauna Loa on the island of Hawaii. Going down one of the steep outer ridges I found a few greenswords, some displaying their purple flowers covered with a fragrant tarry resin.

As I went back through the crater, I was intrigued by that break in the north rim, Koolau Gap, through which lava flows once broke. Californians like to talk about sharp climatic transitions, but their boasts seemed pale beside the measuring stick of the Hawaiian Islands. Half an hour after I left the sunny, arid crater floor I was in a rain-forest so dense and drenching that I was forced to turn back. And so, sunburned, soaked, and amazed, I ended five days on Haleakala (whose name, appropriately, means "House of the Sun") by climbing up the rim again and out.

Known only by a few is Puu Kukui, west Maui's mountain — the reason: rain. While the top of Haleakala is well above the level of most rainstorms, the 5,790-foot summit of Puu Kukui seems to stand just where clouds prefer to drop the quantities of moisture picked up on their unbroken travels across the North Pacific. Puu Kukui's rainfall approximates 600 inches, second only to Mt. Waialeale on Kauai, which is said to get up to 800 inches a year (only in Burma is a higher rainfall recorded). The leeward face of Puu Kukui, unlike that of Haleakala, is only comparatively dry, since

The silversword *Argyroxiphium Grayanum* grows in Puu Kukui's mists.





The greensword *A. viriscens* of Haleakala is a graceful plant.

the lesser stature of Puu Kukui permits wet winds to sweep around it and soak almost all its slopes rather heavily.

From the quaint town of Lahaina I took the road up the lee side, the only approach with a trail to the top. Winding above pineapple fields, this road becomes ominously moist above 2,000 feet. It was a relief, after not a little wheel slipping, to reach the private cabin where I was to stay. Some hint of Puu Kukui's uncompromising climate came that night: while I slept next to the wall of this plainly sturdy cabin I could feel the wind pressing the wall in and out with each new gust.

Puu Kukui's summit was my goal next day, for it is on those topmost reaches that another silversword (*Argyroxiphium Caliginii*) and a greensword (*A. Grayanum*) grow. Upward on the ridges the earth became progressively less solid. At points the trail — if it could be called that — became a series of pools which could be crossed only by clinging to trees around their edges or looking for less yielding mats of sedges to step on. Higher up it was no use trying to keep dry — Puu Kukui's ineffable wetness closed in from above, while the ground became a continuous bog, with soil held

on the mountainsides only by a thick mat of sedges. Each next step might bring either a jellylike quaking of the mud underfoot or an unsuspected plunge above the knees into a well concealed mud-hole. Spattering winds complicated things, for as the trail faded into bog clouds dimmed the view ahead to a few yards. These soaking wind-torn slopes grow a shrubby greensword and a diminutive silversword, in contrast to the robust silversword and greensword rosettes of the dry areas on Haleakala.

The view from the top of Puu Kukui must be truly striking — I can't say. I was there, but my acquaintance with that summit was very pluvial. I was only too happy to take my catch of silverswords and literally wade back down the mountainside. But the fierceness of the climate, and the density of the mossy rotting forest held a fascination which made up for Hawaii's well known tourist charms I had missed. And now in the laboratory I find under the microscope amazing details of the silverswords that surpass even the strangeness of the growing plants in their habitat of desert crater and dripping rain-forest on Hawaiian volcanos.



Monument of the Joshuas

EDMUND C. JAEGER

THE SECOND largest national monument in the United States is the Joshua Tree National Monument comprising 557,934 acres of unspoiled California desert. It lies astride the meeting line of the low lying Colorado Desert and the higher Mohave Desert and this in part explains its great diversity of wildlife, both plant and animal. Whereas the larger Death Valley National Monument which lies to the north is known chiefly for its unusual and diverse geological formations and unique scenic charm based on physiographical features, this Monument is important because of its offerings of broad views of distant desert, its tree yucca forests, and exceptional rock scenery.

To this spacious natural parkland there are three entrances, one from the south through Cottonwood Springs off Highway 99, and two from the north, at Yucca Valley, and at Twentynine Palms, where the well designed Monument Headquarters building, just recently completed, stands in a verdant oasis of arrowweed, mesquite trees and native palms.

Joshua Tree National Monument is anything but flat as you soon realize when you travel over its many miles of winding paved or gravel roads. Within its widely spaced boundaries are low desert creosotebush-covered basins with altitudes of a thousand feet or less and mountains of noble proportions (as high as 5,700 feet) wooded with piñons or nut pines and lovely centuries-old, spreading junipers. Included in it too are rough lava-covered mesas and steep boulder-choked twisting canyons, all casting upon the alert traveler a singularly powerful spell.

Although the Monument was created to serve also as a general desert wildlife sanctuary, it was primarily set aside for the preservation of one of America's strangest trees, an arborescent yucca (*Yucca brevifolia*) known to many as the Joshua tree. Here are found large numbers of this usually large "tree-lily," growing in the numerous coarse-graveled valleys. The best specimens (one of the largest has a height of almost 30 feet and a trunk girth of 13 feet, 5 inches) and densest stands are



Joshua Tree National Monument was created to save from



to save from private exploitation, for the enjoyment of all, a forest of unique tree lilies in a wilderness of rock and desert life

PHOTOGRAPHS BY DON OLLIS

found in the Monument at elevations between 3,500 and 5,000 feet. The trees with their unique armature of long spiny leaves bloom in the early spring; their terminal panicles of large, showy, whitish green flowers and egg-sized fruits are a constant source of wonder to all visitors. Its seeds are harvested by numerous small rodents such as pack rats and two kinds of ground squirrels, the small white-tailed antelope ground squirrel and his bigger cousin, the California ground squirrel. It is always a mystery how they can climb unharmed up through the bristling close-set array of needle-pointed spines to get at the high clusters of seed vessels.

A large number (33) of birds are known to use the Joshua tree as nesting sites. Among these are red-tailed hawks, horned owls, mocking birds, shrikes, and the small ladder-backed or Texas woodpeckers which drill holes in the spongy-wooded trunk. The most remarkable of the birds'

nests are those of the Scott oriole. It is made of yucca fibers and hangs suspended from the underside of branches. The bird builder with body colors of lemon-yellow, black, and white is doubtless the sweetest singing and handsomest of all western orioles.

And while speaking of birds in the Monument I must mention that more than 150 kinds, migrant and resident, have been seen and catalogued by competent ornithologists. Among the most interesting of those passing through are the rather plain blue-gray piñon jays which often in autumn congregate in large numbers and roam about to feed on the occasional crops of piñon nuts. I have seen flocks so large that it took hours for them to pass my camp as they played, while in flight, a kind of slow leap-frog game. All the while they were engaged in noisy "gossip" and moving from one piñon thicket to another. In the same sun-drenched piñon forests are found in autumn small





flocks of cheery-noted white-crowned sparrows which are returning to winter on the desert after their nesting sojourn in the high pine-clad mountains found farther north. Incidentally I must say that this time of autumn bird migration is not only one of the best times to observe the habits of birds, but one of the best also to camp and enjoy day after day the autumn calm that prevails in this sunny upland desert retreat. About the only sounds are the occasional songs of birds, the wisping stridulations of the desert-clicker or the sibilant sighs of gentle winds in the piñon branches.

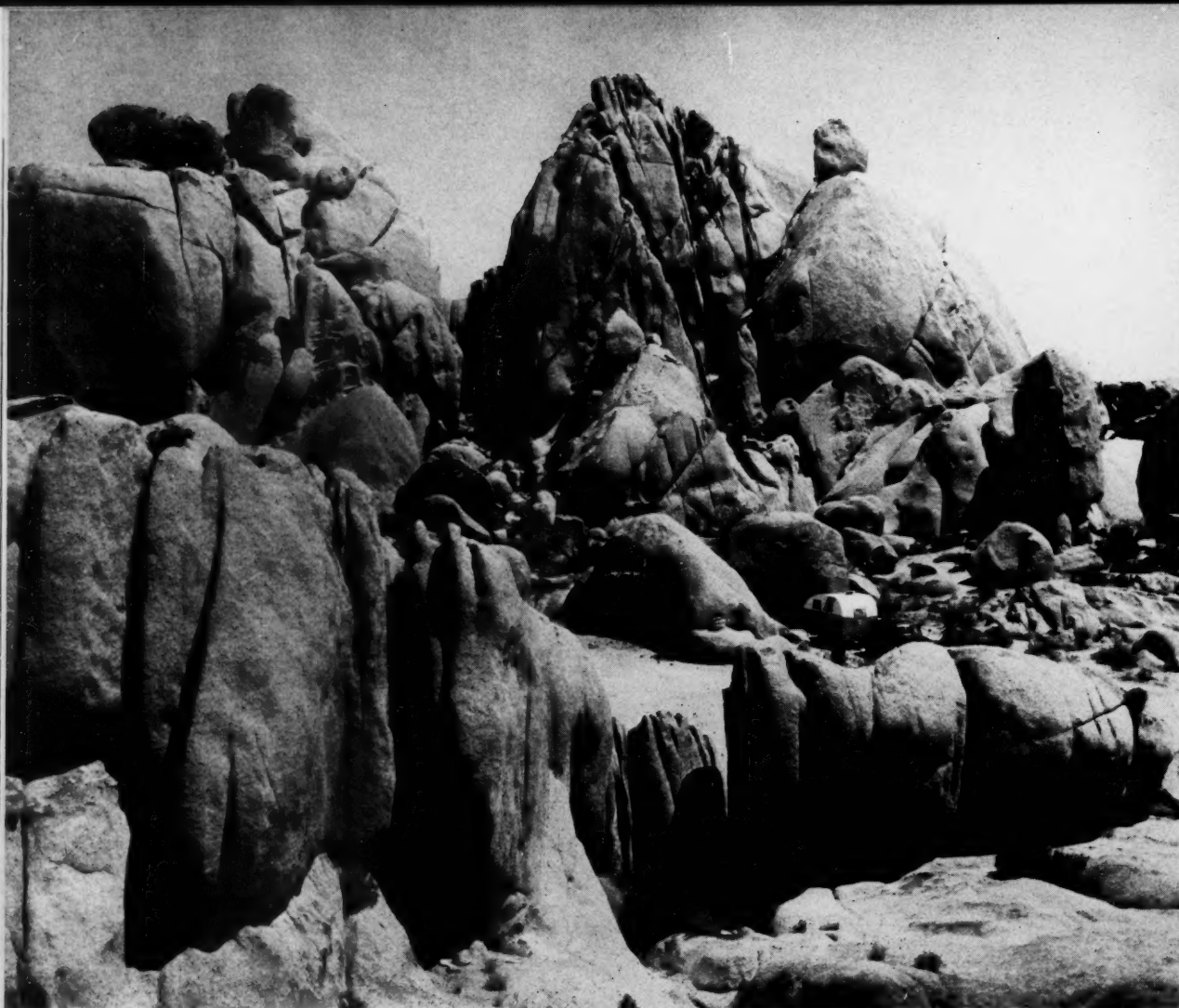
The Monument's greatest scenic charm, well recognized by all visitors, is found in its high plateau area where numerous scattered clusters of mammoth sized granite rocks jut upward from

the level stretches of tan-colored, shrub-dotted gravels — gravels which were formed by slow chemical disintegration of the rocks' steep-sided surfaces.

The material of which these gigantic rocks are composed is called White Tanks monzonite after the White Tank water-basins or *tinajas* around which some of the finest formations are found. The light-tan to pinkish-gray rocks, now so beautifully exposed, were once molten magma hidden far beneath the earth's surface. Heat-induced expansions thrust the hot deep-seated materials upward into the thick mantle of other rocks which covered them. As the magma cooled while subjected to the great weight of rocks above it, it crystallized to form monzonite. In time those ceaselessly working

▲ Joshuas like best to grow in flat areas with deep gravelly soils. Here a forest of young ones is growing up "under the guidance of an elder brother." The tree yuccas grow very slowly—even these small ones may be a quarter of a century old.

◀ Monstrous granite boulders are scattered about at random among the Joshuas, their rounded forms owing to chemical decay and weathering by wind, water, heat, and cold.



At Indian Cove the camper may live in a fantastic setting. Because of their numerous fracture lines, granitic rocks often show a characteristic vertical jointing so that the individual "blocks" of stone appear to have been tipped on end. Note the honeycombing in the middle left of the picture.

Nature plays jokes and poses riddles in this granite landscape. The cleanly split boulders always raise the question: how? The lines of weakness have been built into the rock, are waiting some force such as the washing away of supporting earth, some shift in balance, or change of temperature.



These strangely placed rocks always puzzle most visitors who enter this jumbled landscape. "Who put that rock up there?" some wit is sure to ask. A study of the joints and cracks in the granite may provide some answers. As weathering widens cracks and loosens joints, the uppermost in a pile of granite "blocks" that are rounded off becomes unstable and eventually topples over. Another factor is the washing away of supporting sedimentary material, leaving boulders "stranded." All the granite, in fact, was once covered by these sedimentary rocks, having welled up beneath them in a plastic state as a batholith, an igneous intrusion below the surface. The joints or cracks formed as the granite hardened under the pressure of overlying strata.

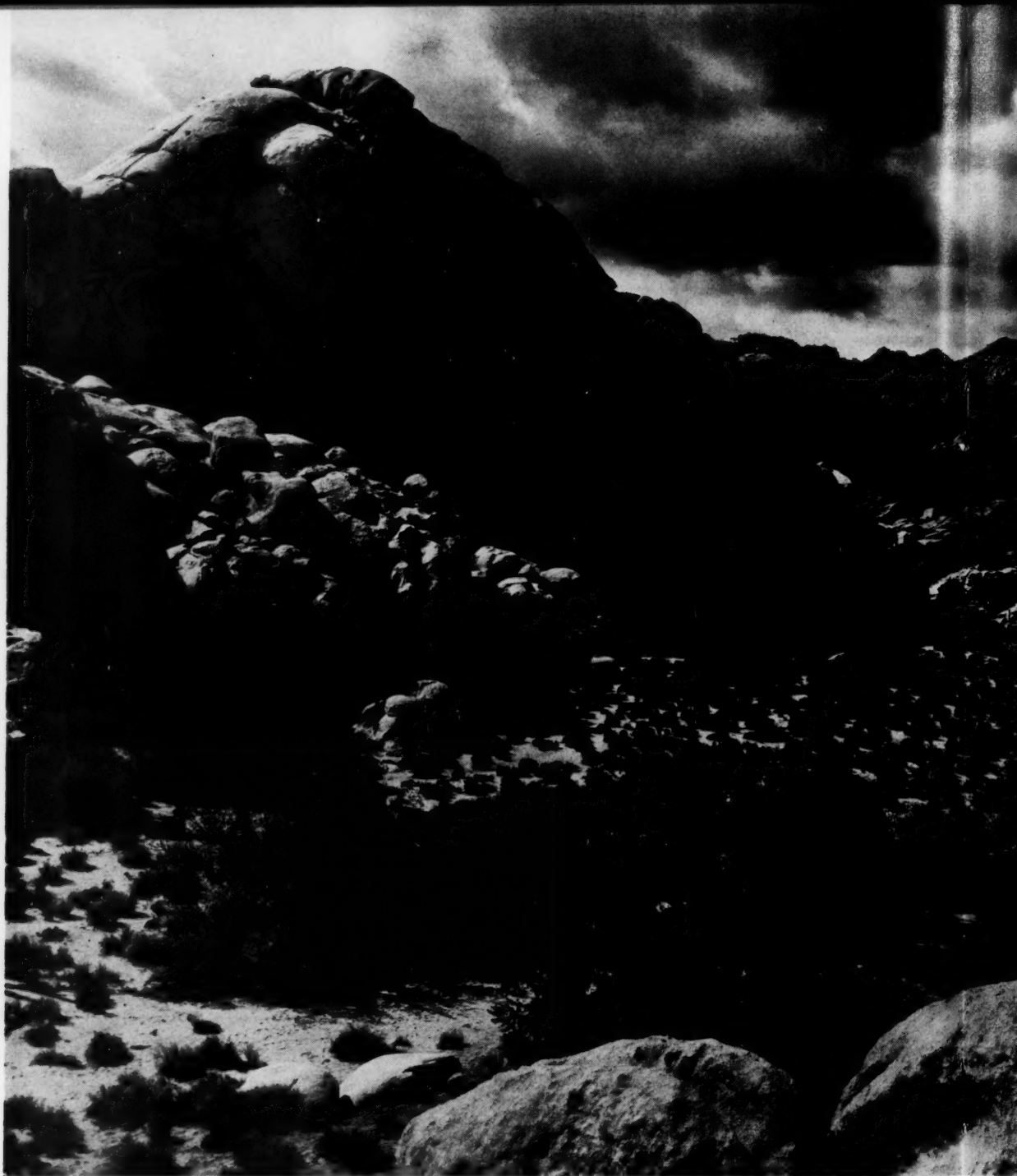


➤ This is the entrance to Hidden Valley. Go on through and see what's beyond — turn the page.

forces of denudation, wind and water, carried away parts of the overburden, as the geologists call the mantle of surface rocks, and exposed these bosses or entombed granitic "hills." Erosive forces have since rounded their surfaces into the beautiful spheroidal, columnar, and other rock forms which make up this "Wonderland of Rocks."

Many narrow bands of contrasting color are seen in the bulky crystalline rock formations. These are called intrusive dykes and are the result of molten material being thrust up through cracks





which formed as the magmatic masses cooled and contracted beneath the mantle. Some of these dykes can be traced for considerable distances. The harder materials of which they are formed weather more slowly than the surrounding granite

and so they often project upward as prominent ridges.

In Lost Horse Valley near the southern end of the granitic rock area can be seen unique examples of juxtapositions or contacts between the light-



colored monzonites and dark red volcanic rocks. Farther to the east are places where molten lavas upwelled and flowed out over the surrounding mountain wastelands.

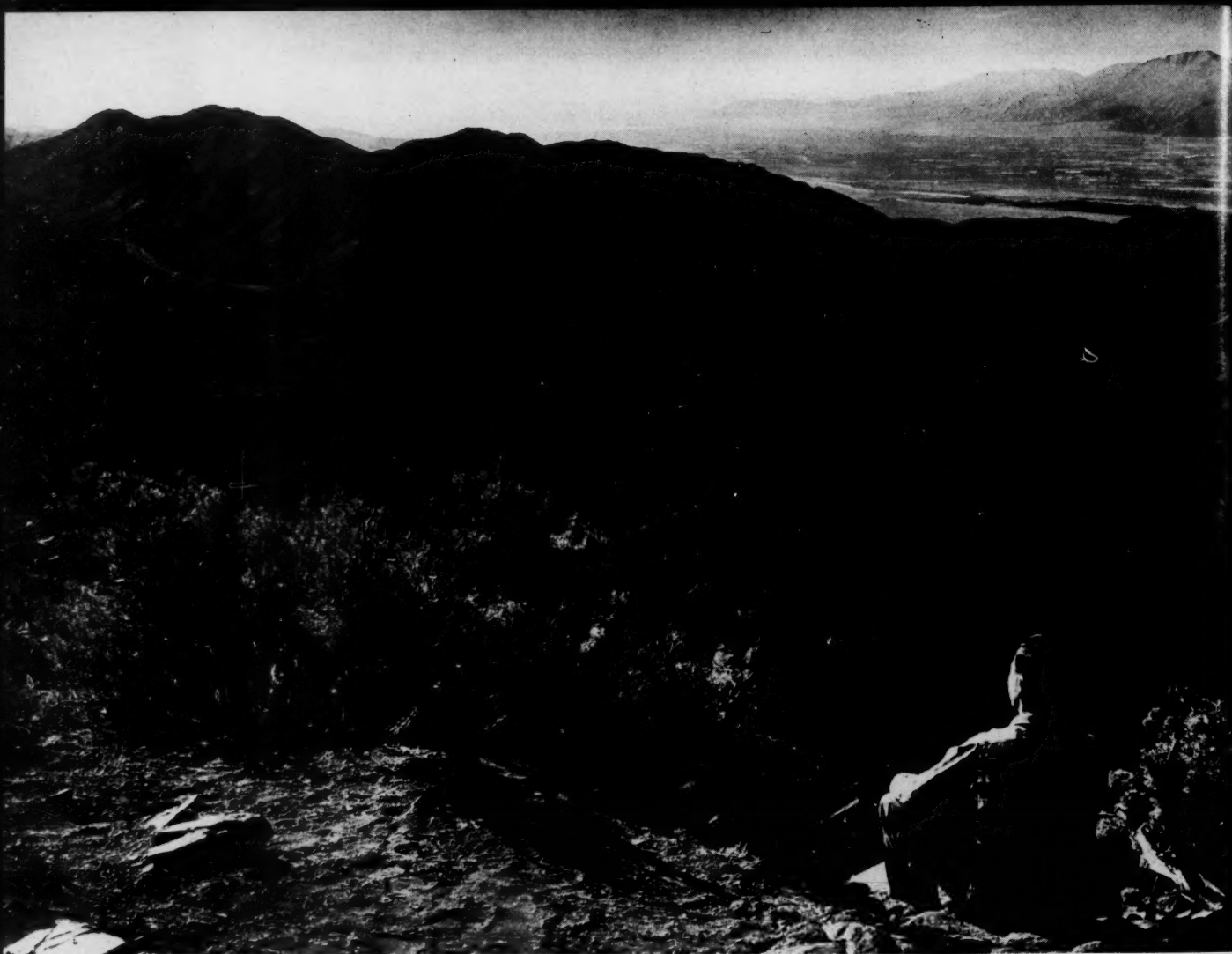
The Little San Bernardino Mountains on the

western boundary of the Monument form a steep escarpment facing the low trough-like Salton Basin. They lie along the fracture zone of the famous San Andreas fault or earth fissure. Their multi-colored crystalline rocks have been much fractured by both vertical and horizontal earth movements. A scenic road leads to the top of these mountains where, at a place well named Salton View, one may look from an elevation of 5,185 feet down into the Coachella Valley, below sea level. Here one gets a magnificent panoramic view of the steep walls of the San Jacinto and Santa Rosa mountains which comprise the northern extension of the Peninsular Range, a mountain chain which stretches almost a thousand miles south-eastward to form the giant rocky backbone of the peninsula of Baja California. From this point of vantage one may see too the shining surface of the slowly-rising Salton Sea, and beyond its southern edge, isolated Signal Mountain, located across the United States-Mexico border (called Signal Mountain because of its use in making early boundary surveys). To the northwesterward lies boldly prominent and, in winter, snow-covered San Jacinto Peak (elevation 10,831 feet) and yet more massive and higher San Geronimo Mountain (elevation 11,485 feet). Salton View was originally

This beautiful remote valley was so well concealed by its rampart of surrounding rock that for many years it was known only to cattle rustlers who are said to have used the enclosure as a safe hideout for stolen stock. The trees — other than Joshuas — that dot the hillsides and rim are mostly scrub oaks, piñons, and low-growing junipers.

called Keys' View in honor of the man, William Keys, who early settled in the Wonderland of Rocks area and who built the original road to this point of wide views he so loved. The name was changed on the recently-made Geological Survey map because it is a well established rule of the U. S. Board on Geographical Names never to use names honoring persons still living.

In historic time this high plateau region of scenic rock splendor was a place often crossed by Indians (Serranos, Mohaves, Cahuillas and even, perhaps, the trade-minded Hopis). Some of the Indians who lived on the more barren low desert came here in late summer and early autumn especially to gather piñon nuts, acorns, and other seeds.



Fire-hardened earthen jars, filled with such seeds and sealed to protect the contents from rodents, have been discovered in rock crevices and natural caves where they were long ago hidden.

In the far eastern end of the Monument is almost level-floored Pinto Basin rimmed in on the west, north, and south by rough-surfaced, steep-sided, reddish-brown mountains and their surrounding aprons of sediments which spread downward to the edge of the basin's flats. On the eastern boundary are the little known and austere Coxcomb Mountains made of clean, gray-white, granitic rocks culminating in strikingly beautiful spires and serrated ridges. It is an area of special interest to botanists because it comprises a much restricted and small plant island in the midst of sere desert. Here are found "in splendid isolation," a few piñon trees as well as a number of other

plants which cannot live on the drier flats below. A most scenic "hidden valley" lies nestled amidst the noble granitic spires of the Coxcomb summit. It is to be reached only on foot but is a rewarding place to visit for the lover of solitudes.

When in times past all the western desert area received much more rain, there once flowed across the sloping bottom of Pinto Basin a small stream ending in a lake about whose borders there lived, some nine or ten thousand years ago, a primitive people who hunted with darts propelled by the atlatl or throwing stick. Their peculiar arrow points of stone as well as other evidences of their simple culture are yet to be found in the clays and gravels of the old lake shore. In the sandy washes and flats of this same lake area are now to be found, in favorable, wet spring seasons, some of the most magnificent and largest fields of desert

day-lilies, anywhere known. I have seen tens of thousands of the closely-set stately spikes of lovely green-and-white-petaled, floral beauties adorning the sandy surfaces.

In my estimation some of the most appealing parts of Joshua Tree National Monument are reached only on footpaths or trails made by the deer, the bighorn, widely wandering coyotes, and jack-rabbits. Particularly inviting is the old four-mile trail, now well-marked from Cottonwood Springs over into Lost Palms Canyon. It passes through large patches of that very rare shrubby spurge called *Halliophytum* by the botanists and named in honor of that exceedingly brilliant and competent botanist, Dr. Harvey Monroe Hall, who, while still a young man studying at the University of California, discovered this plant as he journeyed in this vicinity. *Halliophytum* is known otherwise from only a few places in eastern San

Bernardino County near the Colorado River and in the Kofa Mountains of Arizona.

At the far end of this trail is a lovely group of *Washingtonia* palms (*Washingtonia filifera*), many of their tall stout trunks thatched with clean, tan-colored, down-turned leaves. It was on the rocky slopes of this palm canyon that the author discovered not many years ago one of the rarest of desert land snails, *Helminthoglypta aëtotes*. This small mollusk with beautifully banded shell lives under rocks, coming out of hiding to feed during only a few days a year after rains.

Another rewarding foot-path journey of several miles is to quiet Stubby Springs southward over the rim of Little San Bernardino Mountains where they fall off toward the Salton Sink. Here in a small enclave of green surrounded by several beautiful old cottonwoods is a perennial pool where in summer desert bighorn often come to quench their



An elfin forest of ferociously spiny chollas confronts the motorist as he drops down into Pinto Basin and heads by way of Cottonwood Springs to the south gate and highway 60-70. (See cover for close-up.)

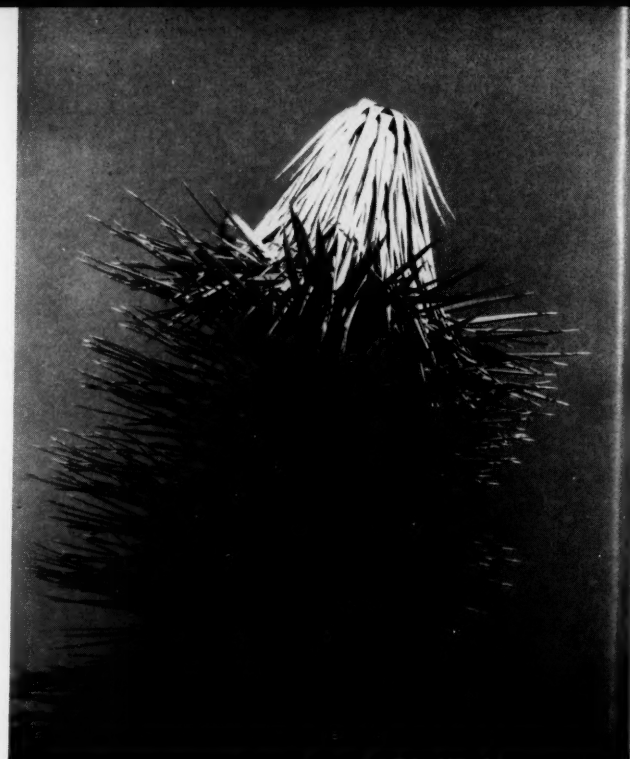
thirst and where a good representation of both resident and migratory birds is constantly about. The number of wild animals and birds drinking here is only equaled by those frequenting the little pool of water at Black Rock Spring farther north — another place to spend some profitable hours bird watching, especially in the spring and

➔ What looks like the crown of some primitive hat is a cluster of down-turned Joshua tree leaves. A beetle, related to the sugar-cane borer of Hawaii, has killed the terminal bud of this branch and caused the tip to die. In time, new side branches will appear below the dead tip.

▼ A fine healthy cluster of yucca fruits, which look good enough to eat raw, look even more appetizing sliced and cooked; but appearances are deceptive — the fruit is filled with bitterness. The flat black seeds, however, yield an edible oil. Flowering time is April and May. A Lower Sonoran Zone plant, the Joshua extends its range across the Colorado River into Arizona, Nevada, and Utah.



summer months. The number of watering places in the Monument is not many so there is always



a good concentration of wild life about the few there are.

The only sizable trees of the high plateau area, other than tree yuccas, desert willows, and an occasional large catclaw, are the single-needle nut pines or piñons, particularly beautiful specimens of which grow on the top and north slopes of the higher mountains. In the Wonderland of Rocks beautiful old gnarled specimens, some of them 400 to 500 years old, grow in sheltered coves or are rooted in high rock crevices on the tops of the granitic domes. They strongly remind one, because of their spreading contorted trunks and branches, of Japanese dwarfed conifers.

In late spring and early summer notable aggregations of Parry's nolina (*Nolina Parryi*), a plant much resembling a narrow-leafed yucca, are seen on the rough terrain of mountain sides, their presence revealed from afar by the large and graceful elongate panicles of small cream - white bell-shaped flowers. The more robust nolinias may have large barrel-shaped leaf-thatched trunks two feet in diameter and four or five feet high. Such specimens must be very old. Another small nolina (*Nolina Bigelovii*), with smaller "plumes" of flowers, grows in some of the narrow slot-like canyons on the Monument's southern and eastern borders.

The best showing of annual wildflowers occurs in early to late spring (March-May), depending on

Sunset comes to the yucca forest. Low clouds tell of welcome rain from over the mountain ranges to the west.

elevation. Then broad, brilliant patches of floral color, with whites, blues, and yellows predominating, often greet the visitor's eye — but not every year, for there are seasons of unfavorably spaced and meager rains when only a small representation of flowers appear, and these are mere dwarfs as compared to the plants maturing in favorable years.

Winter is the season when most of the rains and occasional snows fall. From time to time great cloudbursts occur. While motoring over the road in Queen Valley one may see to the north a strangely-placed barren spot or scar on the mountainside. This is where a few years ago, in a matter of a few minutes, the surface of a whole mountainside was cut away by summer cloudburst waters as they rushed headlong down the steeply slanted rock surface. One cannot see such a spectacle without being impressed by the destructive

and great carrying power of swiftly flowing water and the relative impermanence of the landscape.

How much I regret to say that there are a number of selfish, vociferous groups who are doing their utmost to get this valuable desert wildlife sanctuary opened up for commercial exploitation. One group is seeking the right to prospect for minerals and for mining; another group of businessmen is bringing much pressure to get a road built between Indio and Twentynine Palms so as to make it easy for the many men from the Marine Base to get to the Coachella Valley to spend their money on amusements. This road would cut across the most scenic parts, creating a very serious fire hazard and bringing new policing problems. Conservationists have so far been able to thwart these attempts to despoil the Monument but they must be constantly alert.





This telephone set made its debut to subscribers in 1882, the same year that a nine-mile telephone line was strung over the High Sierra at an altitude of more than 12,000 feet. (Courtesy Pacific Telephone and Telegraph Company, San Francisco)

For \$25- "the World's Highest TELEPHONE LINE"

FRAN HUBBARD

A TELEPHONE LINE was essential to the driving of the Great Sierra tunnel, to cut the fabulous Shepherd Lode, near the crest of the range, in the Tioga Mining District. The *Homer Mining Index*, Lundy's newspaper, on March 11, 1882, carried the following account: "The Lundy and Tioga telephone line, recently constructed and owned by the Great Sierra Consolidated Silver Company of Tioga, is the highest telephone line in the world. The line is about nine miles in length, ascends 4,245 feet from Lundy, crosses Mount Warren Divide at an elevation of 12,250 feet above sea level, descends 3,750 feet to the Lee Vining Creek, and again ascends 800 feet to Bennett City, which is 9,300 feet above sea level. It works to a charm, every word over the line being clear and distinct, even when the most furious storms are beating against the wire along the lofty divide over which it runs. . . ."

Bennett City (later called Bennettville) is now a ghost town. About one mile northeast of Yosemite's Tioga Pass, it was headquarters for the ambitious mining corporation whose home office was in New Bedford, Massachusetts. Messages of both sorrow and joy must have been transmitted over the wire, and on July 3, 1884, it relayed the fateful order to shut down the mine, ending forever the operation of the company.

A careful search of the west slope of Mount Warren Divide, above Saddlebag Lake, will be rewarded by traces of the old line. Insulators and

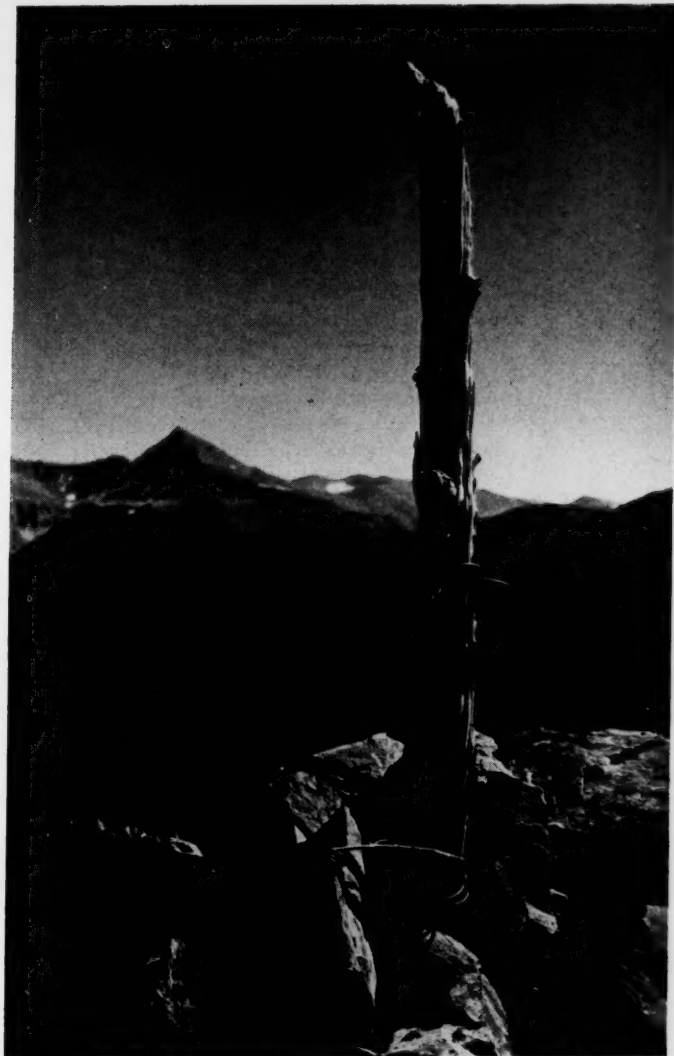
* In "Road to a Rusting Dream" (PD, Sept.-Oct. 1954) Fran Hubbard spoke of a telegraph line to the Tioga Mine. Microfilm copies of the *Homer Mining Index*, not available then, now prove the use of a telephone on the line, as well as a telegraph key.—Ed.



Some of the glass insulators still cling to the tips of long-abandoned poles.

iron wire may be found, and a few snow-broken poles remain above timberline. At the crest of the divide, pairs of unused poles lie side by side, as they were dropped from panting pack animals more than 70 years ago. The east side of the saddle ends in a sheer cliff, and a cautious glimpse over the side and down Lake Canyon reveals many of the old poles still in place in the rocky abutments, though the wire has long since fallen to the fury of the Sierran winters.

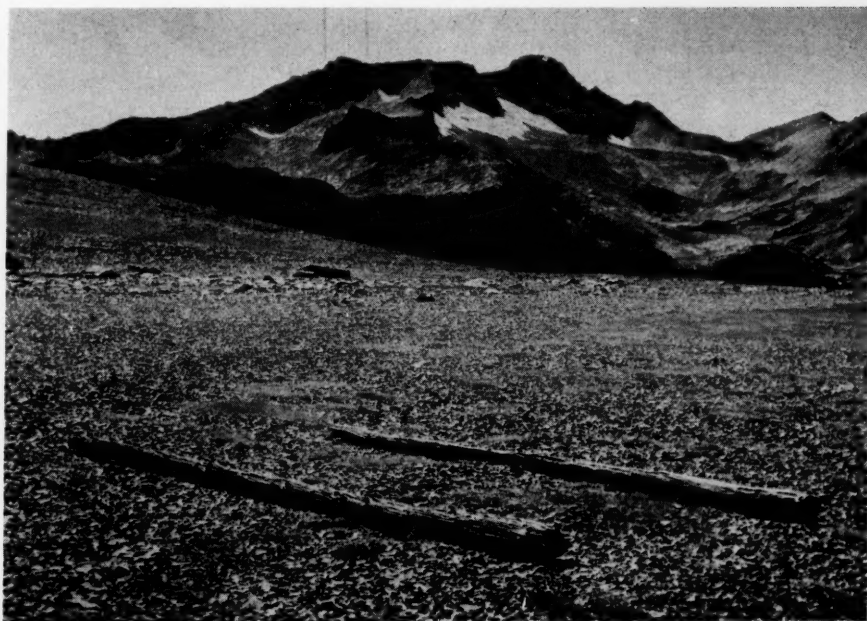
Little was recorded of the effort in time and money which went into the construction of "the highest telephone line in the world." Its final chapter was written in terse words by the sheriff of Mono County who, on February 7, 1888, auctioned "One telephone line between Lundy and Bennettville, complete with poles and wire. . . . For the sum of Twenty-five Dollars." ❀



↑ "... Every word . . . clear and distinct, even when the most furious storms are beating against the wire along the lofty divide over which it runs. . . ." Mount Dana in the background.

← Pairs of unused poles lie at the summit of Mount Warren Divide, unmoved since they were dropped from pack animals, in 1881. Mount Conness and its glacier in the background.

(National Park Service photos by Douglass Hubbard)



AL ALLANSON REPORTS: *Sea Otters on San Miguel!*

ON THE NINETEENTH of August, 1954, we were camped at Cuyler Harbor on San Miguel, most northerly of the Channel Islands off southern California. San Miguel Island is barren of trees, wind-swept, inhabited only by sea lions, elephant seals, foxes, birds, and — we hoped — sea otters.

We took our small skiff — my wife, Sibyl, and I — and rowed against the strong northerly wind. Slowly we made our way to the promontory near Bat Rock at the western end of Cuyler Harbor.

"Look!" Sibyl broke our silence suddenly in a hushed but excited voice.

Where she was looking I saw an animal in the water peering intently at us. A few feet behind it and just leaving a tidal pool was another. It had to climb over the little tidal barrier of rocks to reach open water. At that moment we got our finest view of the sea otter.

The sleek, dark brown body, broad, flattened head, and distinct tail were clearly visible as the animal crossed the tidal pool barrier and slipped quietly beneath the deeper waters of the channel, not more than ten feet from us. Sibyl and I looked at each other realizing we had just observed two sea otters in a locality where they had not been recorded for nearly a century. We had hoped for such rare luck, but scarcely expected to have it.

It seemed particularly appropriate that we should find these splendid sea mammals on San Miguel Island, for here was buried Juan Rodríguez Cabrillo, Portuguese navigator who in 1542 discovered Alta California and the Channel Islands for the Spanish Crown. And to some degree the settlement of California, especially where the Russians and Americans came in, was stimulated by the presence of herds of sea otters on the rocky shores of both mainland and islands, where they were hunted for their valuable fur.

My search for sea otter on San Miguel was prompted by vague reports from abalone divers I knew and had talked to. In 1953 these divers claimed they had seen a total of five otters in a small cove on the north shore of the island, near the west end. Their observation makes it probable that more sea otters inhabit San Miguel than the two we saw the following year.

A large herd of sea otter was "discovered" in 1938 at Bixby Cove, 15 miles south of Monterey when the new highway was opened; this herd undoubtedly represented the last sea otters remaining south of the Alaska Peninsula at the time. Now we can report that the species has spread south still farther, and we may hope it will continue to increase and spread over its former range which once extended to Baja California.

On our return from San Miguel I reported our dis-





SCIENCE LOOKS INTO IT

These three photographs were taken at Amchitka Island, Alaska. (Courtesy U. S. Fish and Wildlife Service)

(Top) Adult sea otter. (Retouched photo, Warden Carl Loy)

(Center) Sea otter emerging from shallow water. (Robert D. Jones, Jr.)

(Bottom) Adult sea otter surprised on the beach. (Robert D. Jones, Jr.)

covery to Dr. Raymond M. Gilmore of the U. S. Fish and Wildlife Service at the Scripps Institution of Oceanography, La Jolla. A month after our trip Dr. Gilmore went to San Miguel on the research vessel *Orca* of the Joseph Sefton Foundation of San Diego. Although he explored the north and east shore of the island thoroughly, he saw no sea otters. Two other members of the party, Conrad Limbaugh and Arthur Kelly, covered the northeast end of the island from Cuyler Harbor to Harris Point. They also had no luck. However, my wife and I stayed on the island 11 days, and but for the one last search by rowboat along the Bat Rock Promontory we might also have come off without seeing any sea otter. Furthermore, the place where we saw our two can only be reached by a small skiff — it is not accessible to land parties or larger craft.

San Miguel is U. S. Navy property and was once used for a bombing range. Now, the diving boats that go to the coves for abalone or shelter from the wind, the sea lions, the elephant seals, the foxes, the birds, and the sea otters are the only visitors or inhabitants of this lonely place.



◀ San Miguel Island, with Otter Cove in the background. (Photograph by Al Allanson, August 1954)

A SIGHT OF SATURN

ON THREE MORNINGS a week, during the school year, the Morrison Planetarium is filled with nearly four hundred school children from schools of San Francisco and neighboring cities. Some of the groups come from as far as Klamath Falls, Oregon. All of them are most eager and create an interested and enthusiastic audience.

Usually, during the presentation of the planetarium program, the lecturer flashes on the dome a slide showing photographs of three of the most interesting of the planets, and asks the audience to name them as they are pointed out. One is Mars, and its identification comes out as a low mumble of voices; then "Jupiter" with more confidence; and last "Saturn" in a chorus that is all but deafening. There is no question of its identity. To test this the writer has changed the order in which the three are pointed out. Saturn always produces the greatest volume.

The striking appearance of this planet, surrounded by its magnificent ring system, is so unique that it has almost become a universal symbol of astronomy. Yet this picture of Saturn, so well known, can only be obtained through the use of a rather high power telescope. When the planet is pointed out in the sky, it proves to be most disappointing. It is not a bright object. It is exceeded in brilliance by more than a half dozen stars and by all of the planets but Mars. Even Mars far outshines Saturn at intervals of a little over two years when the earth and Mars near each other.

During the late spring and summer months of 1955, Saturn can be found crossing the southern sky during the evening, pursued closely by the constellation of the Scorpion. The planet is located in the constellation of Libra (see star map). The bright blue star to the west of Saturn is Spica, and to the east is Antares which is quite noticeably red in color.

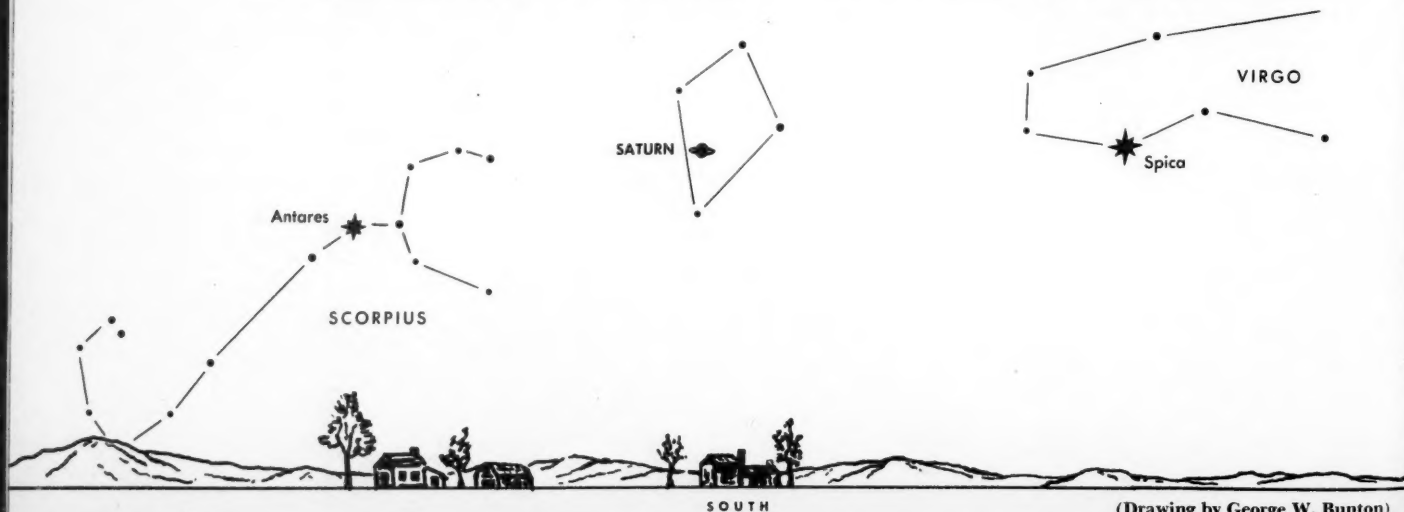
Saturn is one of the giants among the planets, being second in size only to Jupiter. It is 71,500 miles in diameter, almost exactly nine times the diameter of the earth. Its surface is faintly marked by bands parallel to its equator. Its color is slightly yellow with a suggestion of green near the poles. The bands are slightly

orange or reddish, but all these colors are very pale. The rings are nearly pure white, and when seen tipped by the greatest amount, reflect nearly twice as much sunlight as the planet itself does.

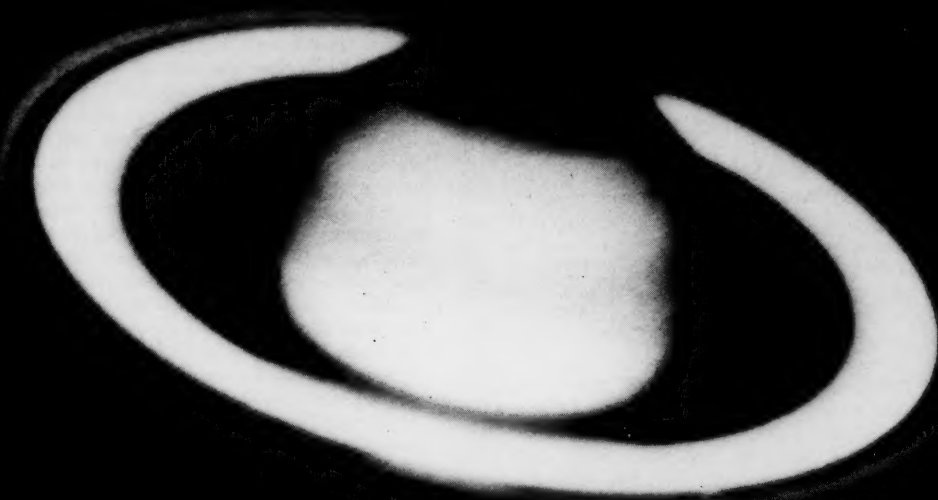
Galileo saw Saturn's rings through his small home-made telescopes, but his instruments were too crude to reveal their true structure. To him they appeared as indefinite protuberances on two sides of the planet. The enigma of the strange appendages to the planet Saturn was solved forty-five years later by Huygens, in 1655. Partly by observation and partly through ingenious reasoning, Huygens demonstrated that the phenomena could be explained by a ring which surrounded the planet.

The rings appear quite solid, but stars have been seen to shine through the rings when Saturn came into line with the earth and a star. It has since been determined that while the rings are not themselves solid as a unit, they are made up of solid discrete particles. Each particle revolves around the planet like a tiny moon, and sunlight, reflected from the myriads of tiny particles, causes the rings to appear quite solid and continuous. It has even been demonstrated, by use of the spectroscope, that those particles nearer the planet revolve in a shorter period than those farther away. This is in complete agreement with the laws of motion which govern the movement of any body about another.

Two questions arise quite naturally at this point. How does it happen that Saturn is the only planet with a ring system? — and how could such a ring come into being? The first must be answered with the statement that, by pure chance, the material was present to form a ring around Saturn, but was just not there for the others. The second question is one that has been considered by many astronomers in the past. Saturn is a big and massive planet. The strong gravitational attraction of so massive a planet resulted in its retaining several satellites (nine, in addition to the millions of particles forming the ring). Jupiter, even more massive, is known to have twelve satellites. It appears that some of the material, which otherwise would have



(Drawing by George W. Buntion)



(Lick Observatory photo by George H. Herbig)

formed a tenth satellite of Saturn, was so close to the planet that it could not congeal into a single body. This can best be understood by explaining that should a satellite be placed at so short a distance from the planet (less than 50,000 miles from the surface), it would be torn apart by the tides produced in it by the giant planet.

The rings are extremely thin — 171,000 miles in diameter and probably only ten miles in thickness. A satisfactory model of the ring system could be cut out of a full sheet of newspaper, and the thickness of the paper would be just about right. When Saturn is in a position such that the rings are turned edgewise to us, the rings seem to disappear completely even in large telescopes. The plural, "rings," is used because the ring system is divided into several concentric sections. The innermost, known as the "crepe ring" does not show up in a photograph, and can be seen only with difficulty in a large telescope. A strong dark division known as Cassini's Division, can be seen near the outer

edge of the system. Others are present, but require a good telescope and a trained eye to be seen.

Saturn is a cold world. Swinging slowly around the sun in twenty-nine and a half years, it is nine and a half times as far from the sun as the earth is. Its temperature has been measured as nearly 250 degrees below zero, Fahrenheit.

The solid surface of the planet lies perhaps 18,000 miles below the visible surface. It is, in reality, a planet only half as big as it appears, covered by a thick layer of ice and an even thicker layer of atmosphere. Furthermore, the atmosphere is made up largely of hydrogen, the lightest of all gases, containing a mixture of methane and ammonia. In this poisonous atmosphere float clouds of ammonia crystals. The resulting density of the giant planet, including its very extensive atmosphere, is less than that of water. If somewhere in this great universe we could find an ocean big enough, we might place Saturn in it and it would float!

G.W.B.

Conducted by George W. Bunton & Leon E. Salanave

Dinosaur: The chips are down

This is Dinosaur: Echo Park Country and its Magic Rivers. Edited by Wallace Stegner. Alfred A. Knopf, New York. 1955. 97 pp. text, 38 pp. (incl. frontis.) photographs, 8 in full color, endpaper map. \$5.00.

Editorial comments, not in customary review form, appear on the masthead page of this issue, under "Pre-Discovery." Following a foreword by its editor and the 36-page section of photographs, *This is Dinosaur* comprises these sections: "The Marks of Human Passage" — Wallace Stegner (author of the notable recent book on the work of John Wesley Powell, *Beyond the Hundredth Meridian*) surveys the human associations with the canyons of the Green and the Yampa since Fray Escalante's crossing in 1776. The passage quoted in *PD*'s editorial pages last issue was from this chapter. "Geological Exhibit" — Eliot Blackwelder, Stanford professor of geology, outlines in clearest terms the story of mountain building and canyon cutting that produced Dinosaur. "The Natural World of Dinosaur" — Olaus Murie and Joseph W. Penfold, representing the Wilderness Society and the Izaak Walton League, review the wildlife species of the Monument, from dinosaurs to mule deer, emphasizing the need for such reserves to ensure the future of many species. "The Ancients of the Canyons" — Robert Lister, University of Colorado anthropologist, discusses the prehistoric Americans who first valued the canyons as a place to live, to farm, hunt, fish, and inscribe the inviting walls with pictographs. "Fast Water" — once bitten by the rapids-running bug, Otis "Dock" Marston says, "the only alleviation — and a temporary one at that — is to run the rapids again." There is no cure. This Berkeley, California, dean of white-water amateurs, reads from the 130-year-old log of Green and Colorado rivers runs two essential requirements: skill and the right kind of boat. Vernal's own riverman, Bus Hatch, has nailed for all time the lie of those who use "dangerous rapids" as argument for dams — his passengers regularly include young children and the aged of both sexes. "A Short Look at Eden" — reading this verbal picture of the Dinosaur that is, by the David Bradley that wrote *No Place to Hide*, you are moved to angry tears as it comes sharply home how close it is, this very minute, to being the Dinosaur that *was*. Just a few willful men stand between *is* and *was*, men who would sell the nation's birthright for a short gain in kilowatts. Finally, in "The National Park Idea," the publisher Alfred A. Knopf states the principle of public interest on which conservationists have solidly based their fight to save Dinosaur. If this battle is lost, the whole national parks structure stands henceforth in perpetual danger.

The incomparable photographs of this beautiful book are by Harold C. Bradley, Devereaux Butcher, Charles Eggert, Don Hatch, Philip Hyde, and Martin Litton.

Where the buffalo roamed

The Buffalo Hunters: The Story of the Hide Men. By Mari Sandoz. American Procession Series. Hastings House, New York. 1954. xii + 374 pp., illus., endpaper map. \$4.50.

How was the incomprehensible sea of American bison, estimated in the late 19th century at a possible hundred million animals, brought down in about a decade to something like one thousand (Hornaday's count: 1,091 in 1889,

as cited by Paul I. Wellman in *Glory, God and Gold*)? Quite simply — by shooting them. So it was done, and the plains were cleared for cattle and eventually wheat or dust. A few were saved at the last because the law of diminishing returns had set in and the profits gone with the last of the bone ricks, so there was nothing to lose by letting them live out the twilight of the species. They and the Indians finally went to reservations; it wasn't so simple with the Indians — they were harder to shoot, and had besides an unpleasant habit of shooting back. So with the buffalo passed one American way of life, that of the Plains Indian.

In a grim sort of way, then, we owe something to those other men who lived by the buffalo, briefly and not through generations. Their way of life was a dead end, one they made themselves by shooting their capital all at once into quick and evanescent cash. But in the process they cleared the plains for the westward course. The Indian Wars took up the shooting started by the buffalo guns. A plainswoman herself, Mari Sandoz was born to the echo of guns, knew old-timers who were among the last of the hide men. Two things, she has said autobiographically, anger her to the point of violence. "One is the sight of the earth exploited, and the other is the knowledge of man, red, white, or whatever color, deprived of the right to walk in pride and dignity before all the world." The hide men had exploited the earth — buffalo were of the American earth — with unequalled ruthlessness; the hide men more than others had started the red men on the road to their degradation. Yet Mari Sandoz has written the hunters' story not in anger at greed and inhumanity but in the spirit of recapturing a phase of American time and the very humanness of the men who ticked it out on the frontier. If the romance of "winning the West" grays down here to greasy hide camps, louse-ridden shabby men, dust-choked shacktowns, violent, sordid death, and carcasses rotting to high heaven under the sun, it also colors frequently with a flash of courage, an act of sacrifice, an intimation of greatness in a people, red or white, above the mean of daily acts. Men moved blindly in a tide, a tide that one way or another had to sweep the plains in that time and no other. The romance colors in detail, too, with the career of flashy if clayfooted "heroes" such as Cody, Hickok, Custer, and of solidier men such as Billy Dixon, Rath, Mooar, and others among the hide men who built parts of the new order while destroying the old.

Mari Sandoz has sharply and movingly defined and detailed a passage in time where the tide of our history broke roaringly over a reef and rolled on westward.

Trails west

On the Oregon Trail: Robert Stuart's Journey of Discovery. Edited by Kenneth A. Spaulding. American Exploration and Travel series. University of Oklahoma Press, Norman. 1953. xiii + 192 pp., 8 illustrations, map. \$3.75.

History marched in reverse to strike the Oregon Trail. No westering wagons pioneered the way over the Continental Divide and down the valley of the Snake to the Columbia and the Pacific slope. The Oregon Trail was broken from west to east, from the Columbia to the Missouri.

Robert Stuart was a young Scot who came to America in the earliest years of the 19th century, became a junior partner in Astor's new enterprise, the Pacific Fur Company, rounded the Horn with the party that founded Fort Astoria

at the Columbia's mouth, and two years later, June 29, 1812, set out overland with dispatches for Astor in New York reporting the condition and needs of his Pacific outpost. Upon his arrival at St. Louis ten months later with his six men, Robert Stuart, at 27 or 28, had carried out "the only part of the entire Astoria venture to have a lasting effect." He had discovered a route across the Rockies that could become a wagon trace. It did, and so it was land, not fur, that built Oregon.

In presenting for the first time (Washington Irving had adapted parts of it freely in his *Astoria*, 1836) Robert Stuart's original manuscript entitled "Travelling Memoranda," Professor Spaulding gives an excellent introductory account of the background of the Astoria enterprise, fitting Stuart's journey into context, and summarizing its significance in shaping the course of America's westward growth. He also gives enough of Stuart's life and character to reveal a man whose becoming an American was this country's good fortune. It was largely Stuart's inner strength, his moral force, that brought his little party through great hardship and danger to fulfill its own mission and thus accomplish unintentionally a far larger one.

The book, of course, is Stuart's — though we are grateful it has been so ably and informatively introduced — and it tells of a West we can scarcely imagine as we bowl along Highway 30. We cross the ranges so easily, so securely, that the picture seems hardly credible: seven men leaving their canoes on the Columbia-Snake and with a string of Indian horses striking into a wilderness of mapless rivers, canyons, and mountain ranges beset with hostile tribes, with only their fishing rods and guns to feed them. Indians stole their horses. They faced winter, redskins, and Rockies afoot and starving. Through all, the youthful leader kept the log that later formed the basis of his "Memoranda."

When you pull up to a motel or roadside hamburger stand, remember that bear, elk, and other meat on the hoof had a great way of being elsewhere when the snows lay deep. In the following decades, when emigrant trains to Oregon picked up Stuart's trace, the lumbering wagons were filled with flour and bacon, tools, and the implements of farming. And a way had been charted for wheels and livestock.

The Opening of the California Trail: *The story of the Stevens Party from the reminiscences of Moses Schallenger as set down for H. H. Bancroft about 1885, edited and expanded by Horace S. Foote in 1888, and now edited with Introduction, notes, maps, and illustrations by George R. Stewart.* University of California Press, Berkeley and Los Angeles, 1953. xiii + 115 pp. \$3.75.

Disaster at the right time and place can insure its victims a permanent place in history. Who can cross the Sierra over Highway 40 without a passing thought, at least, for the Donner Party? What happened during the terrible winter of 1846-47 just east of the pass has totally obscured the exploits of a party two years earlier that actually brought some wagons over that same escarpment and so made an historical first of epic proportions. But the Stevens party, 51 people in 11 wagons, suffered only near disaster.

In his characteristically thorough and interestingly presented analysis of the source documents, Professor Stewart firmly establishes the historic importance of Moses Schallenger's manuscript, "Overland in 1844," upon which

the present account is largely based. Turning to the account itself, we find it a straightforward but spirited narrative of wagon-train travel from Council Bluffs via the Oregon Trail to a point in southern Utah whence the party swung southwestward to follow the trace of the Walker Party of 1843 as far as Humboldt Sink in western Nevada. Here they rested a week, undecided whether to continue southward in Walker's tracks (Walker, however, abandoned his wagon south of Owens Lake, so never took them over the Sierra). At this point "an old Indian was found, called Truckee," from whom, by signs, they learned of a river to the west that offered access to the mountains. Hence Truckee River; and from it they reached the pass that got named Donner but perhaps would have been named Stevens if fate had been as hard on the earlier party. As a matter of fact, the Stevens party split below Donner Lake, some leaving their wagons and going on by horseback. The others had to exert heroic effort to get their wagons over the pass. Now comes the nearest thing to personal tragedy. The Townsends left with their wagon "an invoice of valuable goods." With them was Mrs. Townsend's 17-year-old brother, Moses Schallenger. This brave lad volunteered to winter over on the spot to guard the goods. A very crude little cabin was built, and there Moses stayed from the end of November till he was rescued at the end of February. He all but starved to death, subsisting largely on foxes he trapped. Especially considering the young hero's age, this part of the story is in itself an epic of survival. The cabin had other tenants two years later — the Breen family, members of the Donner party. . . .

Wheels West. By Homer Croy. Hastings House, New York, 1955. xii + 242 pp., sketch map. \$3.75.

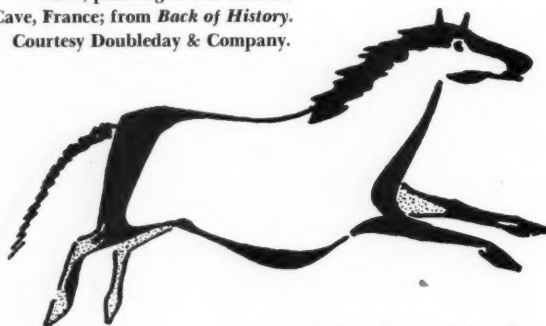
This is the story of the Donner Party, history cast in narrative form, complete with reconstructed conversation and recaptured thought. The form does not make it fiction, but rather, in the hands of so skilful and careful a writer, recreates history in a way to give it the greatest possible meaning to most readers. (The reviewer should mention here that he has not read George Stewart's well known account of the Donner Party, *Ordeal By Hunger* [1936], therefore no comparison is implied.)

The Donner story is so well known it is not necessary to summarize it here. It will be enough to say that anyone who, like the reviewer, was not sufficiently possessed of the details to recall who survived and who did not, will find *Wheels West* one of the most gripping suspense stories he has ever read. Particularly compelling is Mr. Croy's search for the seeds of tragedy — gullibility, indecision, proneness to violence, cowardice, monstrous selfishness — and of heroism — all the noblest human traits — deep within the hearts, minds, and souls of the Donners, Reeds, Kesebergs, Breens, and all who comprised this fateful eighty-seven. If there is a villain, some will pick the brute Keseberg, but perhaps the arch-villain after all was one Lansford W. Hastings who in 1845 published a book entitled *The Emigrant's Guide to Oregon and California* which, as the promotional literature that led the Party to the Hastings Cut-off and its rendezvous with Winter, glossed over certain hard facts. Heroes were many. Since there has to be a heroine, our palm goes unhesitatingly to Tamsen Donner. What a jewel she would have been in the new state's crown!

Wheels West concludes with a documented summary of

the careers of the several survivors — bitter irony that Keseberg had to be one of them! — and a chronology of events. Finally, before the Index, there comes as highly readable a set of notes as this reviewer has yet come across in any book.

Horse, painting in the Lascaux Cave, France; from *Back of History*. Courtesy Doubleday & Company.



Fossils, fires, and freedom

Back of History: The story of our own origins. By William Howells. Doubleday & Company, Inc., Garden City, New York. 1954. 384 pp., drawings and maps. \$5.00.

"It's a wise child that knows its own father. And it is a wise father that has more than the faintest idea where we all began, and why we behave as we do." Those two sentences precede the quotation beginning "Here we are. . . ." from Dr. Howells' book, which was used editorially on page 1. The purpose in *Back of History* is to look for answers to those questions of how we became human. So far the fossil and archeological records have yielded only partial answers, but fortunately we have men like William Howells who not only are professionally qualified to make the best possible sense out of the jigsaw pieces but also are capable of sharing their knowledge with those not so qualified. Dr. Howells is both teacher (Professor of Anthropology and of Integrated Liberal Studies at the University of Wisconsin) and exceptionally gifted writer. This book is definitely for us whose background consists largely of curiosity about such things. It is clear, it is not surfeited with example and detail — but has enough of them to give us concrete ideas, not fuzzy generalities. And Dr. Howells is not only lucid, he is witty.

Some lines of thinking the book leads up to, or into, have been hinted at, editorially — they reveal the author's faith in man's capacity to achieve in some foreseeable future a more nearly universal civilization, through determined social effort. His acceptance of the probability of some form of world government goes hand in hand, however, with his recognition of the vital interplay of conservative and liberal trends in moving culture ahead without upsetting the applecart.

One question unfailingly interests most of us; the provenance of the high pre-Columbian American civilizations. Dr. Howells shows himself openminded but properly cautious about accepting any theory of "sudden intrusions from elsewhere bringing marked changes." On the known archeological evidence he finds the American Indian perfectly capable of having achieved his pinnacles without the help of wandering Sumerians or other bearded demi-

gods from the Old World. This is a healthy anthropological conservatism. But if undeniable evidence should ever turn up in support of one of the intriguing unorthodox theories, we may feel sure Dr. Howells will be one of the first to tell us about it.

The Tree of Culture. By Ralph Linton. Alfred A. Knopf, New York. 1955. xv + 692 + xvi pp., profusely illustrated with line drawings and maps. \$7.50.

This is the final work of one of our truly great anthropologists, the triumph of his life's work which unhappily he did not live to see in print. Its concept and structure evolved from the years of teaching to which he gave one of the best minds in his field, a mind characterized by "a nearly photographic memory for details, panoramic scope, and unparalleled theoretical imagination" (George Peter Murdock).

Leading off with general considerations — the evolution of man, his basic inventions, and his ancient ways of life as hunter, food-gatherer, and farmer — *The Tree of Culture* presents in absorbing detail the great world culture complexes of Southeast Asia, Southwest Asia and Europe, the Mediterranean, Africa, the Orient, and the New World. (A very fragmentary and arbitrarily selected brief of his Conclusion has been adapted to the purposes of an editorial in this issue of *Pacific Discovery*; for any unintended warping or misrepresentation of his thought the editor takes full responsibility.)

A reviewer faced with a work of giant proportions, one which he is obviously incapable of digesting to review size even if that treatment were not a gross impertinence, is apt to fall back on the trick of taking a look at the author's handling of some matter of special interest to said reviewer and — he hopes — some readers of his review.

What was Dr. Linton's ultimate view of the origins of the great New World civilizations? In his chapters on "North American Aborigines" and "High Cultures of the South," he rests on the abundant and weighty evidence, archeological and historical, for the innate ability and intelligence of the peoples who unquestionably entered these continents during the past several millennia by way of northeast Asia. They came qualified, and had the time, to evolve civilizations comparable to those of the ancient Old World. Their apogee was late by comparison; that of the Inca Empire, indeed, being still on the rise when the Conquest struck. Of the American Indians as a whole, the statement: "that they had achieved so much in their isolation and had independently made most of the discoveries and inventions on which civilized living is based indicates that they were essentially a gifted people," gives rise to a logical if academic speculation: "If they had been allowed to develop their culture and work out their destinies, they might have made significant contributions to the stream of world



Cuts: (left) "recumbent anthropomorph," Mexico; (right) "effigy pipe, Hopewell" culture, U.S.

FROM THE READER

Saguaros, Dinosaur, and dust

EDITOR, *Pacific Discovery*:

I appreciated very much the fine article in the March-April issue of your magazine by Weldon F. Heald entitled "Save Our Saguaros!" Mr. Heald has done a commendable job in presenting the unique appeal of the Giant Cactus and the host of wildlife associated with it.

Although these plants have not been put into large scale service by man as yet, it may not always be so. Only recently I heard of work being done to see if they could be used as wood pulp: If anything stays around long enough Man will find a way to "utilize" it.

These trademarks of the desert country should never be taken for granted. Every day their number is diminishing and only an aroused public can prevent more being killed and assure the protection of the existing stands. The West is rich in natural resources but not so rich that we can destroy one of its most outstanding inhabitants.

J. F. CARITHERS, *Superintendent*

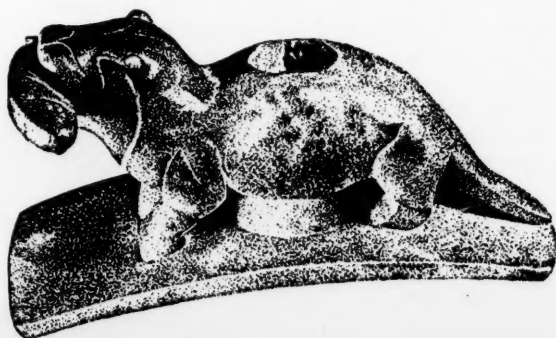
Tucson Mountain Park, Ariz., 29 March 1955.

civilization." And that seems to be as far as Dr. Linton's "unparalleled theoretical imagination" allowed him to soar above solid ground. Reasonableness was one of his marks.

The countless splendid drawings by Will Huntington and the 14 maps by Theodore R. Miller add greatly to the source-book value of this magnificent volume.

The Story of Man: From the First Human to Primitive Culture and Beyond. By Carleton S. Coon. Alfred A. Knopf, New York. 1954. xxii + 437 + xiii pp., profusely illus. with drawings, maps, 32 halftone plates. \$6.75.

When an anthropologist writes a history of mankind, it is bound to depart signally from the historians' tomes most of us struggled through in school. We may look in vain for the orderly sequence of battles, dynasties, and "important" dates. The emphasis will be not on events but on the modifications of culture that produce events. As we have said editorially in these pages, an anthropologist tries to view man in the round, in total being, not just as a parade progressing from corner to corner down a Broadway of time. There will be motion, change being the essence of cultural growth, but not mere marching and counter-marching. The anthropologist takes the historian's chronicles and the archeologist's unearthings and the geographer's mappings as evidence for the nature and state of development of a given segment of humanity in a particular place and time. He relates and interprets all known facts to synthesize a spatial and temporal picture of the human species,



EDITOR, *Pacific Discovery*:

My good friend, Bill Garnett, gave me a copy of the recent issue of *PD* which contained a few of his photographs, which pleased me very much, for I have long been a staunch admirer of his work. What pleased me equally was to discover your magazine, which I had not come across before, and to observe from reading it through what a fine job you are doing in behalf of conservation efforts. In particular, the infamous Dinosaur dam proposal is awarded the kind of exposé which it sorely needs, judging by the passage of the bill by the Senate recently.

... The human spirit must have room to live and breathe in, now and in future generations, ... so that anything I can do, and get my friends to do, to aid a righteous cause such as this Dinosaur thing, I'm trying to do. So — the more power to you!

I read Stegner's book on Powell before I saw your review of it, and thought the other day when I came through the Dust Bowl country on the train, with those states literally all up in the air again as they were in the 30's, ... how tragic it is that (Powell's) attempts to forestall that kind of disaster were disregarded. Will we never learn our lessons except by hindsight?

DICK MCGRAW

Sierra Madre, Calif., 8 May 1955.

trying to keep the whole in view in both dimensions. The panorama should reveal the third dimension of human nature, and the fourth dimension of human aspiration. The anthropologist assigns himself the task of, trying to show what man *is*, and what his evolution foreshadows that he may, in the course of time, *be*. A formidable task!

The reading-between-lines just indulged in should not suggest that the *story* has been shorted out of *The Story of Man* as told by Carleton S. Coon. Quite the contrary — the story gains infinitely in color and meaning under a new light, the more so as star rôles are assigned more liberally to contributors of ideas and inventions than to leaders of armies, to discoverers more than to kings. Aristotle outshines Alexander; James Cook dims Julius Caesar. As to achievements of men — of what moment is the Crossing of the Rubicon beside the Conquest of Climate? And what of the truly great turning points in human growth — is a name significant? Attila swept into history, and out — but the unknown inventors of agriculture changed the entire future for all time. Plain, everyday, nameless people, in their living, working, and thinking, are really the ones who have written our story.

The growing of food from the soil, the smelting of metal from rocks, the capture of energy from heat, the birth of science, the growth of social conscience, the recognition of individuality, the struggle for freedom from want and tyranny, the dawn of responsibility toward the future — these are the big Rubicons in the story of man. Some we as still trying to cross. There are others, yet, of which we dimly see the brink. For the future — Dr. Coon sees none worth having in a state of motionless mass security. He would have us keep the tough sinew and keen mind of the hunter, the love of danger and the unknown and new ideas, the readiness to cross new Rubicons of the intellect or challenge the barriers of space. Such is the essence of being, and remaining, human.

D.G.K.

(Continued from page 1)

... the other, ... the great potentiality of culture [itself], the many possible choices still to be made, which we have not even approached." If there is a lesson in history, and in the soundness of the constitutional forms we have evolved, it is "that we should be loyal to our culture, understanding what it does for us, and that we and it must stand or fall together. Culture must evolve or it must die," but "the only healthy change is a slow one."

What, then, as we rush headlong into a new age, at a speed set by atomic chain reaction, are the chances of steering the machine in the right direction? "What happens from here on?" Ralph Linton asks. "We can go on pushing the present trends of technological development and of endless increase of production, without making changes anywhere else, until we finally reach a state of stasis, and then of collapse. . . ."

The late Dr. Ralph Linton will be remembered for *The Study of Man*. The fruit of his life in that study, posthumously published, is *The Tree of Culture*. This monumental world survey of cultural evolution sees the history of human culture in terms of three "basic mutations": first, "the use of tools, fire, and language"; second, "the discovery of how to raise food," which set the pattern of the civilization we are heirs to; third, "the discovery of how to get power from heat," which led also to the scientific method. The latest mutation is still in progress. We must control it, or else. The alternative to runaway technological progress, Dr. Linton believed, is "a steadily advancing understanding of human beings." With optimism, he held that "for the first time we are beginning to get some insight into what is really human nature." Progress in such studies requires the freedom that is supposedly guaranteed by a democratic political and social framework of society. Totalitarianism is interested in production units, not individuals. "The hope of the modern worker in the social sciences," Dr. Linton concluded, "is that during this period of really surprising freedom — because periods of freedom are rare in world history — we may be able to get far enough ahead to lay a solid platform from which the workers in the next civilization can go on."

Toward what next phase are we trending? Well, going back to *The Story of Man*, we find Dr. Coon dusting off his crystal ball.

The present period of transition, fraught as it is with obvious perils such as the atomic race between the two chief world "centers of unification" and the damage to the earth itself and its atmosphere "brought about by the cumulative effect of man's labors," has a specially sensitive danger likely to be overlooked in global planning. "This peril lies outside the range of most people's experience. Anthropologists are aware of it because it falls within their field of competence. It is the danger that orderly international relations

will break down between the Western nations and the countries recently liberated from colonial rule before freedom and equality can be established as the order of the world. This danger stems from the failure of peoples of different cultural backgrounds to understand one another."

Differences were formerly taken for granted, but now we tend to forget an Arab diplomat or businessman is no less an Arab because he confers with us in a Brooks Brothers suit. Dr. Coon clearly shares his colleagues' belief in the crucial importance of safeguarding cultural and individual integrity.

Let us be reminded, in conclusion, what it is we need most steadfastly to safeguard if we would see a future worth having. None recognize it more sharply than most of our scientists — without freedom they cannot function. Dr. Coon tells what freedom has written into the story of man:

"If we follow the main line of cultural development from the point in history at which our information becomes clear enough to let us reconstruct institutions, we see that it has always moved through the medium of cultures in which individual enterprise has been at a premium, and in which the political institution has existed only in order to give structure to other institutions, such as the economic, familial, religious, and associational." This is conservatism in the best sense, a conservatism expressed in the *conservation* of cultural and individual integrity, which alone give meaning to freedom. We who have freedom (have we?) must guarantee it to all, for "a capacity for steady progress is not an exclusive possession of any one race," as Dr. Coon cites abundant examples to show. And he has a watchword for these times when nonconformity is suspect: "It is important to remember that the individual human being lives a life of his own which does not necessarily have to follow that of his community." It is doubly important in a time when "our greatest shortage is in scientific personnel." With everybody busily investigating scientists, what freedom do scientists have to investigate facts?

Freedom is everyone's job, the slogan says. The gift of fire freed mankind from strictly animal being but it gave him along with freedom a responsibility, each man for the integrity as well as for the safety of all others, for all time. Perhaps the whole argument of these lines — for a time when the fear of difference threatens to destroy freedom in the name of security, for a time when security is becoming a preoccupation at the expense of individuality, when individuality is suspect as being subversive, when the most dangerous subversion afoot is that of our cultural heritage to the purposes of dogmatism and to the end of controlled mediocrity — might be stated thus (and we accentuate the negative):

Prometheus did *not* bring us fire to atomize each other — or to burn each other's books. . . . D.G.K.

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